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Signed

Dated 20 June 2003

Patents Form 1/77

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THE PATENT OFFICE
16 JUN 2002
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The Patent Office

1/77

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P01/7700 0.00-0212975.7

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP9 1RH

1. Your reference P33587GB/KVC

2. Patent application number *(The Patent Office will fill in this part)* 0212975.7

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Mars UK Limited
3D Dundee Road, Slough
Berkshire SL1 4LG

Patents ADP number *(if you know it)* 74787870 01

If the applicant is a corporate body, give the country/state of its incorporation United Kingdom

4. Title of the invention

Mammalian Animal Composition

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

Kilburn & Strode
20 Red Lion Street
London
WC1R 4PJ

Patents ADP number *(if you know it)* 125001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

Patents Form 1/77

8. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	16
Claim(s)	3
Abstract	
Drawing(s)	1

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature Kilburn & Strode Date 6 June 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Kristina Cornish
Tel: 020 7539 4200

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

e) *Once you have filled in the form you must remember to sign and date it.*

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Mammalian Animal Composition

The present invention relates to the use of a probiotic microorganism in the manufacture of a composition for the prevention or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal. It also relates to a method for the prevention or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal, the method comprising administering to said animal, a probiotic microorganism. The invention also relates to a probiotic microorganism, for use in preventing or reducing gastrointestinal *Campylobacter* infection in a mammalian animal.

Companion animals, particularly dogs and cats, are significant vectors of non-food borne gastrointestinal infection. Decreasing the risk of infection of these animals, and the ability to reduce infection when it does occur plays an important role in reducing zoonotic risk. Zoonotic risk is the risk of transfer of infection from one species to another. Clearly, this includes the risk of transfer of infection from companion animals to humans.

In dogs and cats, *Campylobacter* and *E. coli* are the predominant gastrointestinal pathogens, causing both clinical and non-clinical infections.

In dogs and cats, faecal shedding of *Campylobacter* occurs in animals which are infected, whether clinical symptoms are shown or not.

Campylobacter is a most common zoonoses, as well as being a common cause of gastroenteritis in humans. It is estimated that 5% of all human *C. jejuni*-induced enteritis result from exposure to infected dogs or cats.

In view of the zoonotic risk of *Campylobacter* infection from companion animals to humans, it is recommended that control measures that should be considered, which

include restricting contact of children with puppies which may be infected, pets which may be infected be kept away from food preparation areas, affected animals should be kept apart from healthy ones and thorough disinfecting of bedding, food bowls etc should be carried out.

As mentioned above, *Campylobacter* infection in cats and dogs may or may not result in clinical symptoms. Thus it is difficult to know whether any animal, at any time, is infected or not. A 3 to 7 day incubation period is found in dogs and cats, which may be followed by a diarrhoea that ranges from mild to transient to mucus laden bloody diarrhoea. However, since diarrhoea is symptomatic of an enormous number of problems, including a range of infections, dietary problems (rapid change, over eating, scavenging, food tolerance, food hypersensitivity), neoplasia, inflammatory bowel disease, pancreatitis, metabolic disease, systemic disease, and drug reactions, the noting of diarrhoea in itself cannot be used to diagnose *Campylobacter* infection.

Accordingly, it would be of benefit to provide means to reduce or prevent *Campylobacter* infection in the gastrointestinal tract, particularly of companion animals. A benefit is to reduce or prevent *Campylobacter* infection, without the need for a formal diagnosis of *Campylobacter* infection. A benefit of reducing or preventing *Camypylobacter* infection in mammalian animals results in a reduction or prevention of shedding of *Campylobacter* in faeces and thus reduces or prevents the zoonotic risk, particularly to humans.

Accordingly, the present invention provides the use of a probiotic microorganism in the manufacture of a composition for the prevention or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal.

A probiotic microorganism is one which can help to promote a healthy intestinal tract. Probiotic microorganisms beneficially affect a host by improving the microbial balance.

The prevention or reduction of gastrointestinal *Campylobacter* infection results not only in a reduced presence of *Campylobacter* in the GI tract, but also, and importantly, reduces or prevents shedding of *Campylobacter* in faeces. Reduction of the shedding of *Campylobacter* in faeces is a significant factor in reducing or preventing the transfer of *Campylobacter* infection from animal to animal, including from companion animal to humans.

The probiotic microorganism may be any which is known, including one or more from the following:-

> *Lactobacillus (such as murinus, ruminus, rhamnosis, acidophilus, reuteri or mucosae), Bifidobacterium, Bacterioides, Aostridium, Fusobacterium, Melissococcus, Propionibacterium, Streptococcus, Enterococcus, Lactococcus, Staphylococcus, Peptostrepococcus, Bacillus, Pediococcus, Micrococcus, Leuconostoc, Weisella, Aerococcus, Oenococcus* and *Eubacterium.*

Typically, the *Campylobacter* infection will be *Campylobacter jejuni.* This is the most significant strain in humans which causes gastroenteritis. The *Campylobacter* infection may be any other, including *Campylobacter coli, C. upsaliensis, C. lari, C. fetus, C. rectus* and/or *C. hyointestinalis.*

The mammalian animal according to the present invention may be any. Preferably, the mammalian animal is a companion animal, such as the domestic dog or the domestic cat. In the present invention, the terms domestic dog and domestic cat mean dogs and cats, in particular *Felis domesticus* and *Canis domesticus.* The present invention also applies to humans.

The composition for the prevention or reduction of gastrointestinal *Campylobacter* infection may be any composition which a mammalian animal may take. Preferably it

is a composition which any mammalian animal may consume in its diet. Thus, the invention covers standard food products as well as food snacks. The composition may comprise a cereal product or confectionery, such as snack bars, biscuits and sweet products, including candy and chocolate.

When the mammalian animal is a companion animal (a pet animal) the composition may encompass any product which a pet may consume, in particular in its diet. The composition is preferably a dry pet food. Such dry pet foods include dry kibbles comprising a cooked starch source.

The foodstuff may be a cooked product. It may incorporate meat or animal derived materials (such as beef, chicken, turkey, lamb, blood plasma, marrowbone etc or two or more thereof). The composition may alternatively be meat-free (preferably including a meat substitute such as soya, maize gluten or a soya product). The composition may contain additional protein sources such as soya protein concentrate, milk proteins, gluten etc. The composition may contain a starch source such as one or more grains (e.g. wheat, corn, rice, oats, barley etc) or may be starch-free. A typical dry commercial dog and cat food contains about 30% crude protein, about 10-20% fat and the remainder being carbohydrate, including dietary fibre and ash. A typical wet or moist product contains (on a dry matter basis) about 40% fat, 50% protein and the remainder being fibre and ash. The present invention is particularly relevant for a composition as hereindescribed which is sold as a diet, foodstuff or supplement for a cat or dog.

Further, the composition may be a foodstuff in the form of one or more of a cereal product, energy bar, breakfast cereal, confectionery, medicament, food supplement or a drink. The supplement may be in the form of a dried powder, tablet, capsule, liquid or gel.

The probiotic microorganism may be in any form, for example in a powdered dry form

or in spore form (for the microorganisms which form spores). The probiotic may be encapsulated in order to protect it from moisture. In addition, the probiotic microorganism may have undergone processing in order for it to increase its survival in any processing. Accordingly, the microorganism may be coated or encapsulated in a polysaccharide, fat, starch, protein or in a sugar matrix. The probiotic microorganism may be in a coating (outer or a layer), or a filling, or it may be admixed throughout the composition.

It may be preferable to avoid the probiotic being in contact with flour as flour contains enzymes which may adversely affect the viability of the probiotic. Standard encapsulation techniques known in the art can be used, and for example, as discussed in US 6,190,591 (which is incorporated by reference herein).

The composition according to the first aspect of the invention may comprise the probiotic microorganism in any concentration, preferably at a concentration of from 10^3 to 10^{15} viable cells per gram of the total composition. This concentration of cells provides a suitable concentration for successful colonisation of the gastrointestinal tract and providing the optimum health benefits to the animal. An additional probiotic strain may be present at a concentration of from 10^3 to 10^{15} viable cells per gram of the total composition.

According to a second aspect, the present invention provides a method for the prevention or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal, the method comprising the administration of a probiotic microorganism to said animal.

Preferably, the probiotic microorganism is comprised in a composition, for example as described above in relation to the first aspect of the invention.

All preferred features of the first aspect of the invention, also apply to the second.

In the method of the second aspect of the invention, the animal is preferably in need of the prevention or reduction of gastrointestinal *Campylobacter* infection.

The administration of the probiotic microorganism may be by any means or preferably the administration is oral administration (i.e. ingestion).

A third aspect of the present invention provides a probiotic microorganism for use in preventing or reducing gastrointestinal *Campylobacter* infection in a mammalian animal.

All preferred features of the first and second aspect of the invention, also apply to the third.

The present invention is described with reference to the figures. Wherein, Figure 1: Faecal bacteria counts by Fluorescent *in-situ* hybridization (FISH): *Campylobacter* as a % of total population. Showing post-antibiotic (baseline) levels compared to effect of probiotic +/- supplementation for 10 days or 23 days.

The present invention will now be described with reference to the following non-limiting examples:

Example 1

Animal details and husbandry conditions

Cats (n=48) housed in catcare 6 were selected for the study (table 1). Catcare 6 had recently been diagnosed with a clinical naturally acquired *Campylobacter* infection. The cats were group housed at all times and had constant access to fresh water.

Four rooms were selected to undergo probiotic +/- treatment.

In the 10 days prior to the beginning of the probiotic trial, all cats were treated with antibiotics to control the clinical *Campylobacter* infection. All cats received Ceporex (1 tablet twice daily for 10 days). Ceporex contains 50mg cephalexin, a 3rd generation cephalosporin antibiotic.

Feeding regimen

All cats were group fed according to a standard protocol. Large trays of food containing 400g/cat, being offered once daily at 2pm and left down overnight. The diet was standard canned Whiskas Beef (chunk in loaf).

Probiotic dosing regimen

Cats in the probiotic + treatment groups (rooms 1 and 2) were orally dosed with 10mg ($1x10^9$ cells) of a freeze-dried preparation of *Lactobacillus acidophillus*. Deposited under Accession No. NCIMB 41117 once daily after feeding, administered in a gelatin capsule. The probiotic – groups (rooms 11 and 12) received no capsule.

Dosing commenced immediately after the cessation of antibiotic therapy and continued for 27 days.

Study design

The study was designed to incorporate measures at key points during the process of antibiotic treatment and recovery. The measures taken were:

- Group daily food intakes.

- Weekly bodyweight.
- Group faeces quality.
- Bacterial counts by agar culture and FISH.
- Bacterial profiling by API biochemical fingerprinting and ribotyping.

Methodology

Food intakes

Daily food consumption was monitored for each room, being the amount offered minus that refused. Individual food intakes are not available for this study.

Faeces Quality

Group faeces quality was assessed daily using the Waltham Faeces Scoring Guidelines™. Each defecation was graded on a subjective, 17 point scale. Individual faeces scores are not available for this study.

Faecal Bacteria profile

Faeces voided overnight were discarded. Every defecation voided between 8am and 4pm was collected into a clean faeces collection pot and used for bacteriological examination. Faeces were processed immediately in the laboratory under appropriate incubation conditions.

The following bacterial groups were quantified using selective agars:

- Anaerobic culture of *Lactobacilli* on MRSa agar (Oxoid)
- Micro-aerobic culture of *Campylobacter* on selective agar (LabM)

In addition, the following bacterial groups were quantified by fluorescence *in situ* hybridisation (FISH):

- *Clostridia*
- *Lactobacilli*
- *Campylobacter*

Methodology for *Campylobacter* enumeration using selective agar

A swab of faeces was spread onto a plate and incubated micro-aerobically (5% O_2), selecting for single colonies. This method is qualitative and does not provide quantitative information.

Statistical Analysis

Data were analysed using multifactor ANOVA, with antioxidant supplementation +/- as the second factor and students t test, as appropriate. $P<0.05$ was considered significant.

Results

Faecal bacteria

Plate Counts

Lactobacilli were enumerated on three occasions during the study:

- towards the end of antibiotic therapy
- following 10 days +/- probiotic treatment
- following 23 days +/- probiotic treatment

Total *Lactobacilli* in faeces were enumerated using de Man, Rogosa, Sharpe (MRS) agar acidified to a pH of 5.0. There was no significant effect of probiotic treatment on absolute numbers of *Lactobacilli* at any time point.

Campylobacter were enumerated on four occasions during the study:

- before the start of antibiotic therapy
- towards the end of antibiotic therapy
- following 10 days +/- probiotic treatment
- following 23 days +/- probiotic treatment

Table 1: % of faeces samples that tested positive for *Campylobacter* using selective agar.

Campylobacter (log_{10})	**Probiotic +**		**Probiotic -**	
	% positive	n	% positive	n
Pre-antibiotic	100	12	100	12
Post antibiotic	50	12	67	12
10 days +/- probiotic	67	12	100	11
23 days +/- probiotic	88	17	100	15

This method is qualitative and merely indicates the presence or absence of *Campylobacter* in faeces samples. Prior to antibiotic therapy, all faeces samples cultured tested positive for *Campylobacter*, although this was decreased to 59% (overall) by antibiotic therapy. Following 10 days probiotic +/- supplementation, 100% of faeces from the probiotic – group tested positive for *Campylobacter*, but this was decreased to 67% in the probiotic + group. Following 23 days probiotic +/- supplementation, 100% of faeces from the probiotic – group tested positive for *Campylobacter*, but this was decreased to 88% in the probiotic + group (table 3).

Probiotic supplementation therefore decreased the prevalence of *Campylobacter* positive faeces.

Flourescence *in situ* hybridisation

Enumeration of *Clostridia, Lactobacilli and Campylobacter* by FISH was conducted on four occasions during the study:

- before the start of antibiotic therapy
- towards the end of antibiotic therapy
- following 10 days +/- probiotic treatment
- following 23 days +/- probiotic treatment

Bacterial counts (% total population) are given in tables 2 for Campylobacter and shown graphically in figure 1.

There was no significant effect of probiotic supplementation on *Lactobacilli* as a % of the total population or absolute numbers (log_{10}) at any time during the study.

There was a significant difference between probiotic +/- groups in *Clostridia* (as a % of the total population as well as a small (less than one log_{10}) but significant (p=0.007) difference in absolute numbers) prior to the beginning of antibiotic therapy. This difference between groups was, however, eliminated by the antibiotic therapy such that at baseline both groups were similar. Administration of probiotics significantly decreased *Clostridia* (as % of total population) at both 10 and 23 days. This decrease was not reflected in absolute numbers of *Clostridia*, although at 23 days there was a small (less than one log_{10}) although significant (p=0.006) difference between the probiotic +/- groups.

There was no difference in *Campylobacter* between the groups at baseline. At 10 days +/- probiotic supplementation, *Campylobacter* (as % total population) had increased in all 4 groups (figure 1). However, *Campylobacter* (as % of total population) was significantly reduced in probiotic treated animals compared to negative controls at 10 days (table 2, figure 1). Following 23 days probiotic supplementation *Campylobacter* (as % total population) was decreased compared to baseline, but was increased compared to baseline in those animals that did not receive probiotics. At 23 days *Campylobacter* (as % of total population) was significantly lower in probiotic treated animals compared to negative controls (table 2, figure 1). This was reflected in absolute numbers at 23 days, with a small (less than one $\log_{10}$) but significant difference between groups.

Table 1: Faecal bacteria counts by FISH: *Campylobacter* as a % of total population.

Campylobacter	**Probiotic +**			**Probiotic -**			Significance of difference
	mean	SD	n	mean	SD	n	
Pre-antibiotics	14.27	4.92	11	14.48	4.15	10	0.727
Post-antibiotics	6.14	3.83	10	5.25	2.3	12	0.494
10 days treatment	12.2	4.2	12	19.7	9.2	11	0.02
23 days treatment	3.94	2.58	17	14.06	10.0	11	0.001

- Probiotic supplementation resulted in little difference in *Lactobacilli* compared to control animals, as measured by both plate and FISH methodology. This finding is unusual in relation to previous findings, when probiotics have been shown to increase the number of beneficial *Lactobacilli,* and may be due to the compromised health status of the cats in the current study. These cats all had a clinical infection of *Campylobacter* prior to the beginning of the trial and this would be expected to adversely affect the normal microflora of all cats.

- ◊ Probiotic supplementation significantly decreased the levels of potentially pathogenic *Campylobacter* compared to cats that had received no probiotics.
- ◊ The study described herein demonstrates that *Lactobacillus acidophilus* can improve recovery of the feline gastrointestinal tract from the effects of antibiotic therapy, by decreasing the number of *Campylobacter* as a % of the total population. This would be expected to decrease recovery time of the cat and therefore decrease the zoonotic risk from faecal shedding of *Campylobacter*.

Example 2

Determination of the Anti-Campylobacter Activity of Probiotic Microorganism

OBJECTIVE

In this study, the ability of potential probiotic strains of bacteria to have an antibacterial effect on *Campylobacter jejuni* is addressed.

MATERIALS AND METHODS

Bacterial strains and culture conditions

Campylobacter jejuni cultures were maintained on Mueller Hinton agar (Oxoid) and used as an inoculum for liquid cultures (Mueller Hinton broth, Oxoid) that were grown in 20ml volumes in 50ml conical flasks shaken on an orbital shaker.

Potential probiotic strains were maintained on MRS agar and cultured in 20ml volumes in MRS broth under anaerobic conditions.

Experimental set-up

(i) Liquid cultures of probiotic strains were set up and incubated overnight under appropriate conditions. A 1µl loopful of the overnight culture was then used to inoculate the very centre of a 150mm MRS agar plate. These large plates were incubated anaerobically overnight to allow the growth from the spot inoculum.

(ii) Pathogenic liquid cultures were set up on the same day as the probiotic spot cultures and incubated overnight. Overnight pathogen cultures were adjusted to A_{600} 0.4 before inclusion in the assay.

(iii) To 15ml of molten MH agar, 200µl of the adjusted pathogen culture was added and swirled gently to mix. This agar/pathogen mix was then poured into a 90mm petri dish and allowed to set.

(iv) When pathogen inoculated agar set it was aseptically removed from the petri dish. Two sterile disposable loops were used to remove the agar by gently lifting it away from the dish and slowly lowering the agar disc onto the spot of probiotic growth on the 150mm agar plates.

(v) The agar "sandwich" was incubated overnight at 37°C under aerobic conditions.

(vi) After overnight incubation, the zone of no bacterial growth over the probiotic spot was measured and the diameter of the probiotic spot subtracted from this figure. The resulting value is taken as the zone of inhibition.

(vii) All experiments were carried out a minimum of three times for each strain-pathogen combination.

RESULTS

Anti-Campylobacter Potential of Probiotic Strains

Following incubation of the potential probiotic strains with campylobacter jejuni the zones of inhibition were determined for each strain (see table below).

Table

Probiotic Strain	**Average Inhibition Zone (mm)**
L. acidophilus	19.3
L. ruminus	16.3
L. reuteri	5.3
L. murinus	9.3
L. mucosae	2.7
L. casei	21.3

DISCUSSION

The anti-*Campylobacter* activity of the strains is clearly demonstrated.

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Mars Incorporated
6885 Elm Street
Virginia 22101
USA

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT
issued pursuant to Rule 7.1 by the INTERNATIONAL DEPOSITARY AUTHORITY identified at the bottom of this page

NAME AND ADDRESS OF DEPOSITOR

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR:

Lactobacillus acidophilus WAL ML1

Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY:

NCIMB 41117

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by:

☐ a scientific description

☒ a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 10 October 2001 (date of the original deposit)[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on (date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: NCIMB Ltd.,

Address: 23 St Machar Drive,
Aberdeen,.
AB24 3RY,
Scotland.

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dando

Date: 13 November 2001

[1] Where Rule 6/4(d) applies, such date is the date on which the status of International Depositary Authority was acquired.

Form BP/4 (sole page)

Claims

1. Use of a probiotic microorganism in the manufacture of a composition for the prevention or reduction of gastrointestinal *Campylobacter* infection, in a mammalian animal.

2. Use, as claimed in claim 1, wherein the probiotic microorganism is *Lactobacillus*.

3. Use, as claimed in claim 2, wherein the probiotic microorganism is *Lactobacillus acidophilus*.

4. Use, as claimed in any one of claims 1 to 3, wherein the *Campylobacter* is *Campylobacter jejuni*.

5. Use, as claimed in any one of claims 1 to 4, wherein the mammalian animal is a dog, cat or a human.

6. Use, as claimed in any one of claims 1 to 5, wherein the composition is a foodstuff.

7. Use, as claimed in claim 6, wherein the foodstuff is a dry pet food.

8. A method for the prevention or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal, the method comprising the administration of a probiotic microorganism to said animal.

9. A method, as claimed in claim 8, wherein the probiotic microorganism is comprised in a composition.

10. A method as claimed in claim 9, wherein the composition is a foodstuff.

11. A method, as claimed in claim 10, wherein the foodstuff is a dry pet food.

12. A method, as claimed in any one of claims 8 to 10, wherein the administration is by oral ingestion.

13. A method, as claimed in any one of claims 8 to 12, wherein the probiotic microorganism is *Lactobacillus*.

14. A method, as claimed in claim 13, wherein the probiotic microorganism is *Lactobacillus acidophilus*.

15. A method, as claimed in any one of claims 8 to 14, wherein the *Campylobacter* infection is *Campylobacter jejuni*.

16. A method, as claimed in any one of claims 8 to 15, wherein the animal is a cat, dog or a human.

17. A probiotic microorganism, for use in preventing or reducing gastrointestinal *Campylobacter* infection in a mammalian animal.

18. A probiotic microorganism, as claimed in claim 17, which is comprised in a composition.

19. Use of a probiotic microorganism, substantially as hereinbefore described with reference to one or more of the examples.

20. A method for the preventing or reduction of gastrointestinal *Campylobacter* infection in a mammalian animal, substantially as hereinbefore described with reference to one or more of the examples.

Figure 1